

SatFACTS EXTENDED

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GAMMA Cards: Another fraud?

Their origin was said to be Europe (some claimed Italy, others Greece) and the 'virtues' included being *immune* to Irdeeto 2 CM (counter measure) 'attacks'. In fact it was Gamma doing the attacking and Irdeeto holding the defensive line position. On April 22nd the defense repelled the attackers and Gamma was dead in the water, at least in Australia.

Magic cards (even those so-named) have existed in various forms from 1996; essentially for as long as authorized cards have been used to decode subscriber decoders. Each attempt to 'bust the system' has elevated the skills of both the attacker and the attacked; with each new 'authorized card' the sophistication of the encryption algorithm has had a 'generation improvement'. The earliest card-hacks merely relied upon copying the internal software of an authorized card to a blank card; it was called 'cloning', the creation of two or more cards sharing the same authorization stream numbers. As a commercial gray market product, cloned cards were vulnerable to shut-down; the subscription service located one such card, read out the numbers inside and simply dropped that set of numbers out of the authorization stream. In some European areas as many as 10,000 cards 'shared' one number and with the birth of Internet web sites devoted to card hacking, numbers were identified and shared in great quantity.

Early card hackers were ahead of the law - in the sense that the act was not yet illegal and on a country by country basis it would be some years before manipulating cards would become punishable by fines and/or jail time. Some countries, notably Canada, took the legal position card hacking and hacked-card sale was only illegal when the pirates were attacking their own services; it being perfectly Okay to be in Canada and create cards for USA services. This legal position

Capsule Report

"The security layer has been updated through a forced firmware update and stream. Third party boxes unable to be updated were left behind. Older version 2.1 and 2.2 cards cannot be addressed via the stream command line and *should still work* in any box. It is the card which gets addressed, checks the security layer of the box, and then decides to show picture or not. Standard subscription cards do from now on only work in (firmware) updated provider boxes."

(Rewritten from an internal Austar memo)

originated decades ago when Canada and the US routinely fought skirmishes over which country would be able to use specific radio frequencies and later television channels. The Canadians routinely lost these wrangles and an attitude developed internal to Canada that if US pay TV services, whether received with the aid of piracy instruments or using authorized receivers smuggled across the border, were simply not of interest to Canadian law. HBO was first to go into a Canadian court asking that "reception and use" of its service be declared illegal in Canada; the court sent them packing with a terse, "If the service in question originates outside of Canada, our laws do not apply to it; go home."

This is an important element to everything that followed the mid-80s initial decision because it created Canada as a 'free-pirate-zone' where skillful individuals or groups could work away without fear of being visited by the authorities, developing piracy hardware (and later cards), selling them without fear of reprisal inside of Canada and exporting the product(s) to the USA and elsewhere. The piracy devices became "illegal" only if discovered inside of the USA. This is the nexus, or root, of the current on-going court case in California where DISH Network is suing NDS (see second story, this issue).

In this issue

GAMMA? Another fraud (p. 1); NDS versis DISH Open Forum (p. 8); Transponder updates (p. 10)

Gamma cards are said to have been developed in Europe but by year 2000 the national border lines separating which pirate, where, did what and even when had become totally blurred; Internet. When it became practical for a would-be pirate in Turkey to record off air his local pay-TV data stream and send it as an 'attachment' to essentially any web equipped location in the world, the job of tracking and identifying the source for 'source code breaks' became almost impossible.

Gamma, and we have no insider 'designer knowledge' here, borrowed from the now ancient art of cloning with some new software wrinkles. The Gamma creators had a marketing program, a business plan, involving establishing master distribution in a new area (such as Australia) and then it was up to the distributor to create 'retail cells'. The theory was that by limiting cards using a 'shared number' to some small quantity (originally to be fifty but later this grew to a larger number), the mathematical odds of one of a specific number being discovered in use would limit customer turn-off losses to a number small enough to be replaced by new cards within a few days. In all piracy marketing the most vulnerable layer is the retail distributor; the guy or gal wandering around pubs and Sunday Boot Sale lots offering to "get you Austar for a one-time payment - more channels than you would normally elect to pay for."

There was, in Australia, a core bed of under utilized Humax IRCI 5400 MPEG-2 receivers, capable of functioning with Aurora, Austar or Foxtel encryption schemes provided they had the appropriate 'smart card' installed. Piracy provided that card and by our research the quantity of the 5400 sitting around unused or underutilized in Australia exceeded 90,000. That number, 90,000, would become a target marketing number for the Australian appointed Gamma card master distributor. These same receivers had been in-use up to the day when Austar + Foxtel upgraded their Irdeto 1 encryption system to Irdeto 2, at which point they quit. To the would-be Australian 'master distributor' all of the numbers fit; he would pay A\$25 per card from his European source, load from software provided cards in 50-100-200 clone number sets, and go into the marketplace for "retail dealers" at \$75 to \$100 per card. And the retail dealers would venture into pubs and Sunday Boot sales with \$200 pieces of plastic. And a guarantee, perhaps not in writing, that if a card was busted, replacement cards would be available for a lower price - replacement cards utilizing the numbers of a new, different card.

This proved to be a weak point, setting aside the willingness of "retail dealers" to provide

back-tracking detail to the AFP (Australian Federal Police) in exchange for lighter charges individually. For if there was a written record (as in a PC file) of card sets sold, with their authorization numbers, then there was hard evidence for the AFP to discover. Moreover, once discovered, and handed over to Irdeto and Austar and Foxtel, they had all in one place at one time the complete records of all of the Gamma cards in circulation.

April 22

Smart card piracy has always had a weak spot; the people on the street selling cards at the retail level are in it for quick dollars and individually most have no prior police convictions. It seems like an almost harmless way of creating \$10,000 (100 cards bought for \$10,000 and sold for \$20,000); backed of course by that 'guarantee' - if the card number "goes down" a replacement set of cards for a *modest* (seldom specifically identified) cost.

On April 17 the AFP, Austar, Foxtel and others reported "following an extensive investigation, approximately a dozen individuals have been apprehended in possession of illegal satellite television piracy smart cards and supporting software." One of the reports indicated "50,000 piracy cards were confiscated at one location raided." Within hours a small quantity of functional Gamma cards were shutdown, providing a temporary breather to thousands of others who believed they had escaped detection. It was a false belief.

Dawn April 22; "terrible Tuesday" as various web sites reported. Three Austar fed Foxtel channels were missing; Fox Sport 1, Fox Sport 2 and Fox Sport 3. This situation persisted for approximately 6 hours while the web became very active as those using Gamma and similar cards were hoping against hope the problem was correctable. It was not; around 1PM Australian Eastern essentially all of the Austar channels received through any Gamma card disappeared leaving only FTA Expo and TVSN to view.

There was an Email letter issued at 1PM Australian Eastern by Austar competitor SelecTV and we quote from it here.

"Police have seized hundreds of fake pay television cards in the first investigation of its kind amid fears there are up to 50,000 already in use across the country. Federal officers (April 16) raided 10 properties in Victoria, Queensland, and NSW, including three in Sydney, where they seized \$169,000 and several computers. They arrested two men in Victoria, alleging they were a part of a syndicate producing the fake subscription TV (STV) encryption, or 'gamma' cards. There have (previously) been arrests for pay television piracy under state law, but these - the result of a six



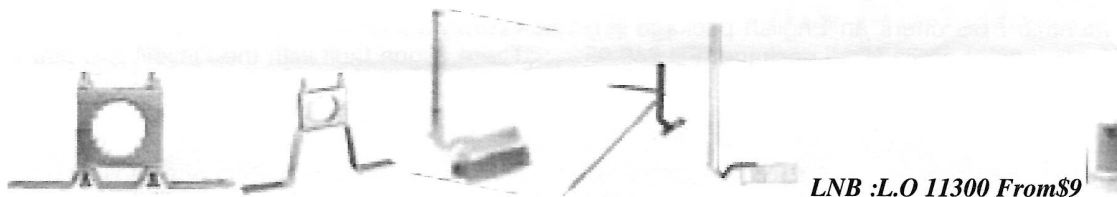
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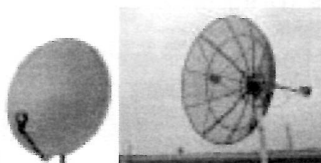
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month investigation by the Australian Federal Police - are the first under the changes to the copyright act that began early this year.

"Kim Williams, chief executive of Foxtel, said the raids sent a message about piracy. (On April 15) Rodney Doove, Mount Waverly in Melbourne's east, was charged with making and selling unauthorized decoders since July of last year. A 27-year-old man from Sebastapol was due to face court in Ballarat (April 18); he is charged with making, distributing and selling fake smart cards and dealing with the proceeds of crime.

"There are many exciting times ahead for SelecTV and we look forward to working with you" - a message aimed at the dealer to whom this Email letter was personally addressed.

Yes, SelecTV knew about this shut-down of Gamma cards well enough in advance to attempt to turn their "not us" posture into a marketing opportunity. It would later be explained by SelecTV that Austar and Irdeto had delayed turning off the Gamma cards to allow the AFP to complete its sweep of identified individuals related to both the 'national distributor' and 'retail dealer' level of suspects. SatFACTS would learn the original date for the shut-down had vacillated between April 1 and 10 and was, indeed, only postponed to allow the Federal Police the opportunity to grab as many suspects as possible in the Gamma 'scam'.

The Scam

As clever as the Gamma designers may, or may-not, have been, they apparently overlooked or chose to ignore one vulnerability of the piracy card; Irdeto had, and always has possessed, the ability to require each individual card to be software 'mated' to a companion receiver. Take any recent vintage Austar receiver and turn it over; on the bottom you will find a paper sticker that was placed there by the installer. This allows Austar records to record the smart card serial number along with the receiver serial number and to carry both in their data base. Further, there is that previously largely unused software 'matching' language during which as the receiver receives the data stream it is asked if the card number inserted into its slot is in fact the card number which has been recorded as the "mate" to the receiver. And if it is not? End of the line - no more reception. Gamma cards would have a different number of course - end of reception.

It has been said that when AFP grabbed the master files from the 'distributor' they found individual Gamma-based card set numbers; no doubt they did. But the present upgraded (as of April 22) system does not rely upon having identified the Gamma card numbers. This is verified by a handful of people who were using authentic

Austar issued cards in various non-Austar receivers (such as the Humax 5400, Strong SRT 4654X) and these also stopped functioning at the same instant as did those fed by Gamma cards (the non-authentic receiver software was unable to 'return' a 'we match' message to the software data stream).

There was another group affected, quite understandable under the circumstances; those using 'card splitters'. This is a device widely sold to Australian pubs and private clubs which allowed one Austar card to drive up to 7 separate receivers; each tuned to a different Austar channel. The 'card splitter' had a special appeal to establishments where had they subscribed for up to 7 individual receivers they would have been charged far more per month than their 'of record' single receiver. The card installed into the card splitter device, short interconnecting cables connecting to individual receivers through a green-coloured PC board device which emulates the actual card (having the correct pin connections to simulate a real card). When the splitter functioned as advertised (many did not), up to 7 receivers each tuned to a different Austar channel would be supported - allowing simultaneous display of (for example) Austar/Foxtel Sport 1, Sport 2, Sport 3 and even user selected sporting matches for which a separate fee had to be paid for reception. They all quit, as if they were Gamma cards - of which some doubtless were - at the same time as the Gamma card served receivers and the legitimate cards inserted into non-Austar-issued receivers. Overall, tens of thousands of receivers went down on April 22 and Irdeto had identified and plugged another hole in their CA system software.

Post April 22

As SatFACTS Extended goes to press, there are no known non-Austar issued receivers functioning with legitimate Austar cards inserted. One receiver, the Octagon available within Australia, appears to be working as a 'non-service-issued' STB using the NDS variety card. There are no known (to SatFACTS) functional NDS-card-variety 'card splitters' in the marketplace which means possession of an Octagon receiver and a 'genuine' NDS card essentially gets you nowhere you would not be if the same card was inserted into a Foxtel issued receiver. The only logical use for this receiver would be in PNG or New Caledonia where Foxtel does indeed reach, and where to ship both a card and a mating receiver would be more complicated than shipping a legitimate NDS card alone. It is likely, upon reading this here, Foxtel will close this (very minor), loophole; such are the forces of life at work.

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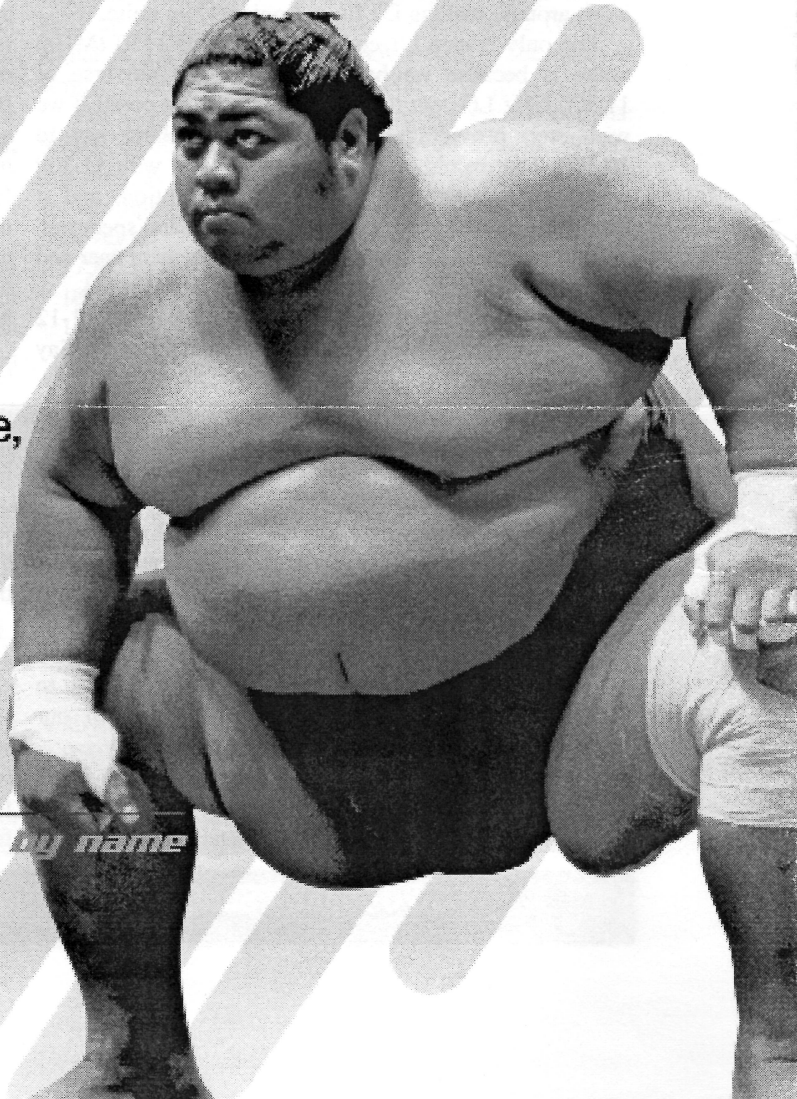
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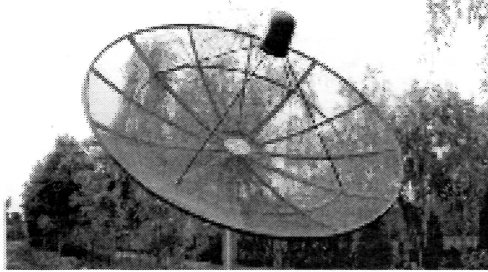
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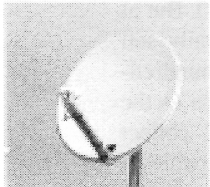
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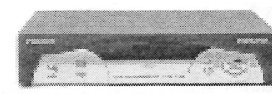


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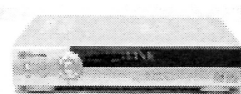
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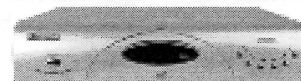
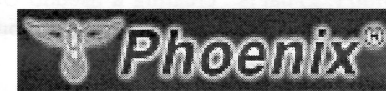


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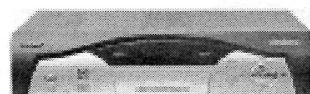


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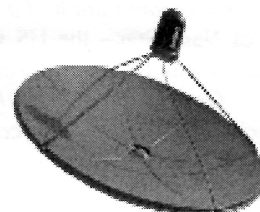
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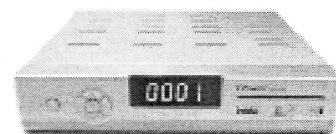
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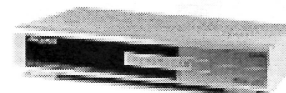
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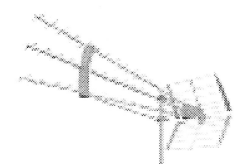


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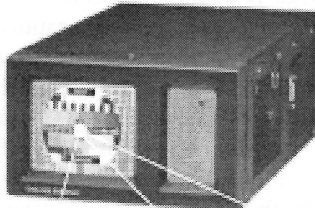
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The USA Case: DISH versus NDS

Two very large, very powerful forces are locked in battle in a court in Santa Ana, California as you read these words. As we have reported in some detail in SatFACTS, the American number-two satellite delivered pay-TV firm, DISH Network, believes their competitor in the CA (conditional access) design world, NDS, has deliberately busted their encryption system and provided piracy hack cards and later Internet instruction to anyone who wished to break into the DISH service. The case is worthy of Sherlock Holmes, or a Tom Clancy novel. It comes down to two individuals pissed off at one another for personal reasons: DISH's Charlie Ergen against NDS's Rupert Murdoch.

Until very recently, NDS was an indirect owner of DISH competitive service DirecTV. Some years ago DISH's Ergen and DirecTV's Murdoch attempted to marry the two services into one; they came to non-resolvable differences of opinion over something very mundane; *which* CA system to use with the proposed, new, combined service. DirecTV's Murdoch insisted on using NDS, an Israeli firm he controlled while DISH's Ergen was equally certain his 50% owned 'Nagra USA' should be the CA provider. The issue was significant enough that plans to merge the two competitive services ground to a halt; it would not happen.

By 'coincidence', there shortly appeared on 'the web' information leading people to break into DISH without paying. Ergen maintains, in a California court, this was *not* a coincidence - that Murdoch personally directed NDS to "bust the Nagra encryption system utilized by DISH and to distribute that knowledge on the web" thereby making DISH TV less valuable and vulnerable to wide scale hacking. One or more 'billion' US dollars is sought by DISH for compensation. NDS, of course, denies the allegations and tells the court, "this is all a figment of DISH's imagination." NDS admits to "reverse engineering" Nagra encryption, but denies any use of that knowledge to spread the information through Canadian smart card sources or the web. The trial apparently comes down to, 'which liar do you believe', as both sides are making wide use of admitted 'professional hackers' including several who were paid by NDS not insignificant sums of money to do things such as 'busting Nagra'.

Foremost in this list of court witnesses is one Christopher Tarnovsky who appeared in California and denied he had participated in peddling NagraStar busting information to the detriment of DISH Network. Tarnovsky is central to the DISH case, primarily because he received packets of \$20,000 in US bills by airmail from a Canadian source which just happened to be the primary web

site that was telling people how to crack the NagraStar CA system. In his court appearance, he would admit to reverse engineering NagraStar but deny any participation in spreading that information with others.

Within days of appearing in a California court, Christopher Tarnovsky would appear as an 'invited guest' at a very special public gathering scheduled in Amsterdam, Holland at the Movenpick Hotel; the 'Black Hat Conference. There, computer hackers and members of the CA world met to discuss in forum the state of software hacking planet-wide. The amazing part, here, is that Tarnovsky agreed to appear and then what he had to say. We excerpt that.

"Sure, I have broken the cards of Kudelski (Nagra)" he admitted to the group. "I was paid by NDS to do it. This is an activity all companies in the trade do. But why would I have published these codes on the Net for free? I am not stupid and I never had the intention of taking that risk. Companies that integrate security codes into semiconductor devices think their secrets will be well guarded. That is not true, of course."

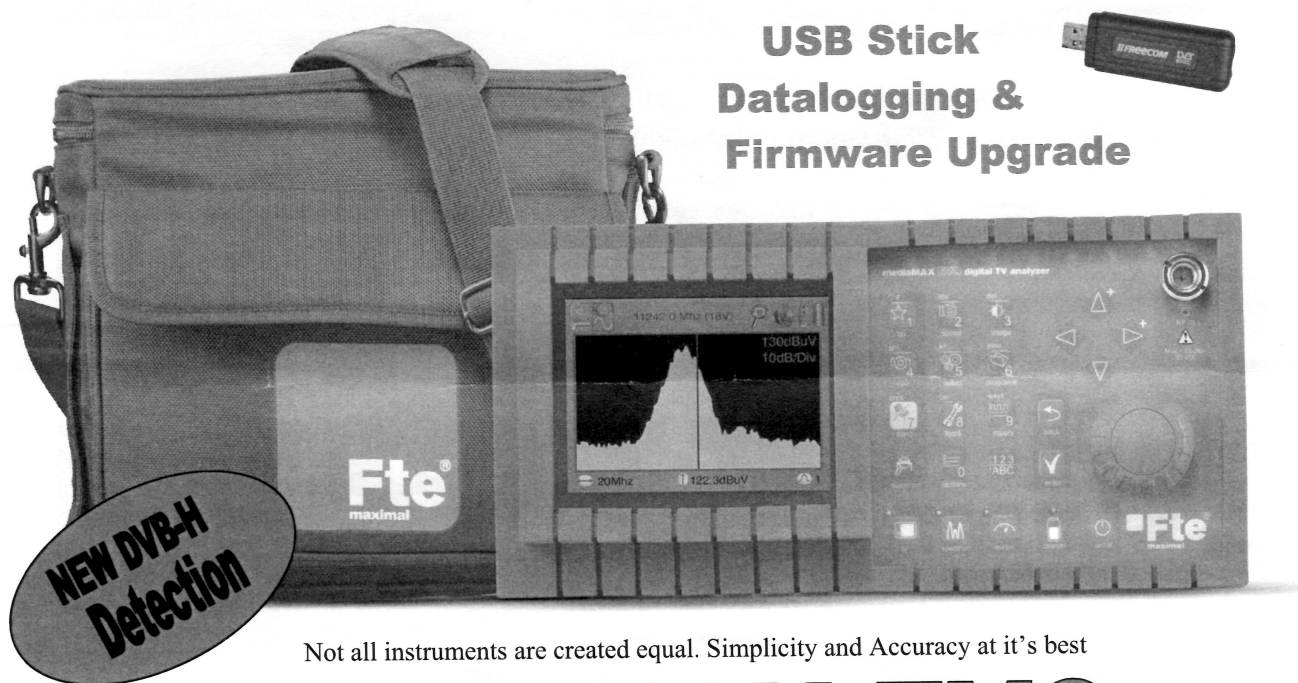
He went on to explain how he reverse engineered the NagraStar security chips. "I used HydroBromic acid to eat away at the passivation layers and doping guns to cut or add traces to a working IC. A (powerful) Zeiss microscope (allowed me) to enter the heart of the chip where the hidden codes reside. The successive layers of silicon are revealed with acids and lasers. I bypassed the protections they had built in with long microscopic needles and 9 times out of ten, within minutes for the weakest, hours for the best designed, I had the content of the card(s)."

As for Kudelski (a Swiss origin company owning Nagra), he noted with an obvious air of arrogance, "Sorry for them; the last two generations (of DISH cards) have been broken. The next will be also. They have not invested enough into research over the past decade. Today, Kudelski has more money as we see with their share price on the market. They hope to rebuild with the (DISH versus NDS) trial; but they will lose."

Tarnovsky admitted to the group, "I have been paid by NDS through 2007." His testimony a week later in the California courtroom would include the addition, "I was paid by Harper Collins publishing company", a Murdoch controlled book publisher. How the \$20,000 packets of cash shipped to him from Canada over a number of months did not constitute 'piracy payments' was not revealed.

NDS has admitted to hiring Tarnovsky, and other 'professional hackers', as a "legitimate attempt to get control of our own piracy". (Update: p.8 here)

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Data-Logger	Yes, Also Captures MPEG picture to USB stick
Constellation Diagram	Yes, for QAM
Sat Finder	Yes, with NID detection
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Update on Pacific satellite operations

Scheduled launches: Vietnam's Vinsat 1 is ready to begin tests at 131E; 8 C and 12 Ku transponders.

Optus C1/156E: "Transponder T1/centre frequency 12.305V has been split with T1 lower now 12.287V (Sr 27.800, 3/4) with 3 HD channels testing ("E", "F", and "G"); Foxtel services 261, 262, 263; AC3 audio, CA. T1 upper currently not in use; various SCPCs were using this 72 MHz wide transponder. Elsewhere, T20/12.688H (Sr 27.800, 3/4) has been testing 3 HD services including (EPG listed) ESPN HD and Disc/NGeo; Data rates as high as 17.6 MBit/s have been noted. T11/12.305H has added a new (Austar) 'Star Picks' channel with an audio and 6 data PIDs but no video. Al Jazeera on T2/12.367V (Sr 27.88, 3/4) continues to run FTA but requires manual PID entry (V1121, A1122) to load. Another 'hidden' TV channel is on T9/12.647V (Sr 27.800, 3/4) designed for use by Foxtel iQ boxes (V4071, A4072). The Westlink 'WLK' channel operated by W.A. Department of education (T6/12.527V, Sr 30.000, 3/4) is on occasion used for 'private feeds' (e.g. evening of April 28). During these feeds a normal Aurora card will not decode the service; not a card fault. The service continues to rebroadcast Perth's Access TV channel 31 on Thursday, Friday nights as well as most of the day Saturday and Sunday." (IF, Qld)

Optus D2/152E: "ABC's 3 news feeds (12.538H, 12.545H, 12.555H; SR 6.980, 3/4) joined by ABC sport feeds on 12.527H (6.800, 3/3; note difference). Globecast has been running 'Big Brother' feeds from Gold Coast 12.680V, 3/4 but NTL CA. Globecast MCPC changes: 'Deepam' was added to newest MCPC - 12.545V, 22.500, 3/4 running at 704 x 576 and 3.34MBit/s, FTA (as of presstime this transponder does not have a CA

table so channels here, for now, cannot be encrypted. Then it was moved to 12.733V, V2102, A2101 replacing NHK World - which in turn was moved to 12.545V (V6101, A6201), FTA at presstime but relabelled 'NHK World 2'. Indian 'TTV' operated FTA mid-April with a subscription contact banner (Australia 1300-886-548; NZ 0061-3-9466-8548). UBI update: Two vacant channels (C1340 on 12.608H) and C1312 (12.394H). Potential customer confidence is probably not buoyed with the large purple and blue bars running vertically through UBI's 'Info Channel' display (12.394H). Optus business MCPC: T3/12.407V (Sr 30.000, 2/3) which did have 'Centrelink' is now a blank picture (2.1 MBit/s) and ran FTA (V80, A81) until the end of April; now CA." (AI, Vic.)

Palapa C2M/113E: "TV One returned to 4054H, Sr 5.460, 3/4 FTA." (Dennis)

Soapbox: "Big Brother, CSI, Family Guy and more are now available free to view through Veoh.com; Crackle.com (owned by Sony) has music videos, free. Due to start soon, Hulu.com with The Simpsons, Tonight Show, Prison break and other USA origins to be free to view on broadband connected PCs." (Arron) "Zinwell ZMT-620FTA NZ terrestrial STB can be improved with external software loads but the instructions clearly warn, "This warranty is only valid for appliances used according to the manufacturer instructions. This product must not be modified or changed in any way." (Brownie) "ABC running a short promotion titled 'Redefining Television' which attempts to explain the reason for changing ABC digital channel numbers. I have seen many TVs that incorrectly load ABC's 21 and 22 (see SF#164, p. 4 letter reference Topfield STB). The solution is to delete the original channels and reload the receiver." (NS, NSW)

Presstime updates:

DISH-NDS trial stalls. Abe Peled, NDS Group CEO, left California after being scheduled to appear as a defense (NDS) witness, leaving behind an affidavit. The Judge called a halt to the trial and demanded to know why Peled would, by his absence, be unavailable for cross-examination from DISH attorneys, noting, "it is important to this trial high level executives from NDS appear to determine how far up the management chain this card hacking project reached." The court was clearly dismayed with the absence of Peled who had appeared on the witness list for NDS which would have allowed his cross-examination by DISH attorneys; jury starts on it May 13.

AUSTAR has sent formal legal notice letters to an undetermined number of satellite TV dealers and installers warning them against "selling certain digital satellite receivers ... for the purpose of receiving AUSTAR television service." The letter also warns against including 'Austar' in any advertising or sales literature and threatens 'legal action'. "Austar customers are contractually bound to use Austar provided decoders with the Austar smartcard," the letter warns.

German court rules against 'free to air patchable receivers'. Pay-TV operator Premiere has obtained an immediate injunction backed by fines of up to 250,000 Euros. The receiver importer, Zehnder, has been providing Asian built IRDs capable of being user-patched to receive pay-TV programming 'protected' by Nagra CA software.

A similar court action is underway in the USA.